



## Diversity and Biomass of Drift Seaweeds from the Tuticorin Coast, India

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### ABSTRACT

The present study is focused on the distribution and biomass of drift seaweeds from the two stations (Tuticorin harbour coast and Tiruchendur coast) of Tuticorin district, India. Seaweed survey was made in both the stations during January to December 2011. Totally 85 species were recorded including 46 genera in all groups of seaweeds which includes 13 genera, 30 species of green algae, 12 genera, 20 species of brown algae and 21 genera, 35 species of red algae. Maximum numbers of species were recorded in red algae compared to other two groups of green and brown algae. A totally 70.733 kg fr. wt m<sup>2</sup> of green algae were collected in throughout the year including station I (33.582 kg fr. wt m<sup>2</sup>) and station II (37.151 kg fr. wt m<sup>2</sup>). *Caulerpa scalpelliformis*,

*Stoechospermum marginatum* and *Spatoglossum asperum* were also recorded throughout the study period with maximum value of biomass in both stations. The maximum biomass was recorded in the month of January (9.681 kg fr. wt m<sup>2</sup>) at station I, and minimum biomass was recorded in June (0.363 kg fr. wt m<sup>2</sup>) at station II. The present study could be useful as new baseline record for future bio-monitoring studies in Tuticorin and Tiruchendur coast. The seaweed resources may provide useful data for the conservation and commercial use of marine algal resources in this region.

### Keywords:

Diversity; Biomass; Drift seaweed; Tuticorin coast; Thiruchendur coast

## 1. INTRODUCTION

Seaweed is the macroscopic marine algae; they grow in the intertidal, shallow and deep sea areas up to 80 meter depth, estuaries and backwaters on solid substrate such as rocks, dead corals and pebbles. Seaweeds are divided into green, brown and red algae based on the types of pigments, morphological and anatomical structures. Seaweeds are also used as human food, live stock feed and fertilizer for plants in many parts of the world. They contain more than 60 trace elements, protein, iodine, bromine, vitamins and several bioactive substances of economic value and they also serve as both feeding and breeding grounds for invertebrates and fishes (Krishnamurthy, 2005).

There are 20,000 species of seaweeds found distributed globally. The major sources of seaweeds are the northeast, western central and southwest pacific areas. India, with a long coastline (7500 km), has vast resource of seaweeds along with many open coasts and estuarine areas. Distribution of economic seaweed resources along the Indian coast was first mapped by Thivy, 1958. The Tamil Nadu coast was surveyed during 1971–76, covering a distance of 320 km from Rameswaram and adjoining islands to Melmidalam (Colachal) by CSMCRI (Central Salt Marine Chemical Research Institute), in collaboration with Central Marine Fisheries Research Institute (CMFRI), Cochin and Department of Fisheries, Government of Tamil Nadu. There is luxuriant growth of seaweeds along the Southeast coast of Tamil Nadu, from Mandapam to Kanyakumari; Gujarat coast; Lakshadweep Island and the Andaman and Nicobar Islands. Seaweed beds are occur around Visakhapatnam in the eastern coast, Mahabalipuram, Gulf of Mannar, Tiruchendur, Tuticorin, Kanyakumari and Kerala in the Southern coast; Veraval and Gulf of Kutch in the western coast; Andaman and Nicobar Islands and Lakshadweep (Kaliaperumal and Pandian, 1984; Selvaraj and Selvaraj, 1997; Sahoo et al. 2001; James et al. 2004; Manilal et al. 2009; Christobel and Jeeva, 2009; Paul and Raja, 2011; Jeeva et al. 2012; Satheesh and Wesley, 2012).

Hirata et al. (2003) has been reported drift seaweeds from the Atlantic, Pacific, Indian Oceans and the Red Sea. Mitra, (1946) and Krishnamurthy (1967) have attempted to estimate drift seaweeds from selected parts of the Indian coast. Umamaheswara Rao and Sreeramulu, (1964 & 1970) have reported 80 macro and micro algae populations at Visakhapatnam coast. Kaliaperumal et al. (1995) studied with the distribution of seaweeds and seagrasses during the deep sea survey conducted in the first sector from Kattapadu to Tiruchendur in Tamil Nadu coast between December 1986 and March 1987 covering an area of 650 km. In this survey 58 species of marine algae were recorded of which 7 genus belong to Chlorophyta, 12 genus to Phaeophyta and 39 genus to Rhodophyta. Muthuvelan et al. (2001) reported on the availability of seaweeds to be 3385 and 3432 tonnes (fresh weight) for an area of 22 and 25 km, out of 73 and 52 km shoreline of Middle Andaman and North Andaman Island respectively. Mantri and Chaugule (2005) reported ethanophycological use of drift seaweeds from the Maharashtra coast.

Prasanna Lakshmi and Narasimha Rao (2009) studied the numerical data which were collected for one year from March 2008 to February 2009 to study the distribution of Marine algae on the intertidal rocky surfaces of Visakhapatnam Coast, using the 0.5 × 0.5 m quadrant. Satya Rao et al. (2011) studied on the seasonal variation data of seaweeds on environmental and hydrographical parameters of surface waters at three different study sites of Bhimili Coast for a period of one year from March 2009 to February 2010. Dadolahi-Sohrab et al. (2012) also evaluated the seasonal variations of seaweed biomass and species composition at six different sites along the coastal areas in Bushehr Province. Satheesh and Wesley (2012) recorded on the macro algal resources of inter-tidal region of Kudankulam coast. Cosman et al. (2013) reported on seaweeds of Muttam, which is formed of different inter-tidal rock shores showed rich algal vegetation during the study period (January to December, 2011), this study was initiated to explore the richness of seaweeds in Muttom coastal waters of southwest coast of India. Janet Rani et al. (2013) studied on the distribution of seaweeds in five selected stations viz., Arockiapuram, Kootapuli, Uvari, Manapad, Punnakayal in the south-east coast of Tamil Nadu. The observed pattern of seasonal distribution and richness of seaweeds is likely to be related to the life history of the seaweed and also due to the intertidal rocky reefs. Hard rocky bottom of these study sites greatly supports the algal diversity and provides suitable shelter. Although not much published with species list information's are available about the seaweeds of Tuticorin

and Tiruchendur coastal area, hence the drift seaweeds availability and biomass were carried in this study. These sites are belongs into the Gulf of Mannar biosphere reserve area, Tuticorin district.

## 2. MATERIALS AND METHODS

Drift seaweed distribution and biomass were determined in the Tuticorin harbour and Tiruchendur coastal area following the method described by Baardseth (1955). Seaweed survey was made in both the two stations during January to December 2011. One kilometre lengths were selected for the sample collection. Drift seaweeds were collected during low tides from the study area by placing a 100 cm<sup>2</sup> quadrat at 10 random of each station. They were washed well in the habitat water at the sampling site to remove silt and debris including the phytal fauna. The collected seaweed samples were identified in species level and the biomass values were recorded as fresh weight (wet) of the seaweed/unit area (m<sup>2</sup>).

## 3. RESULTS

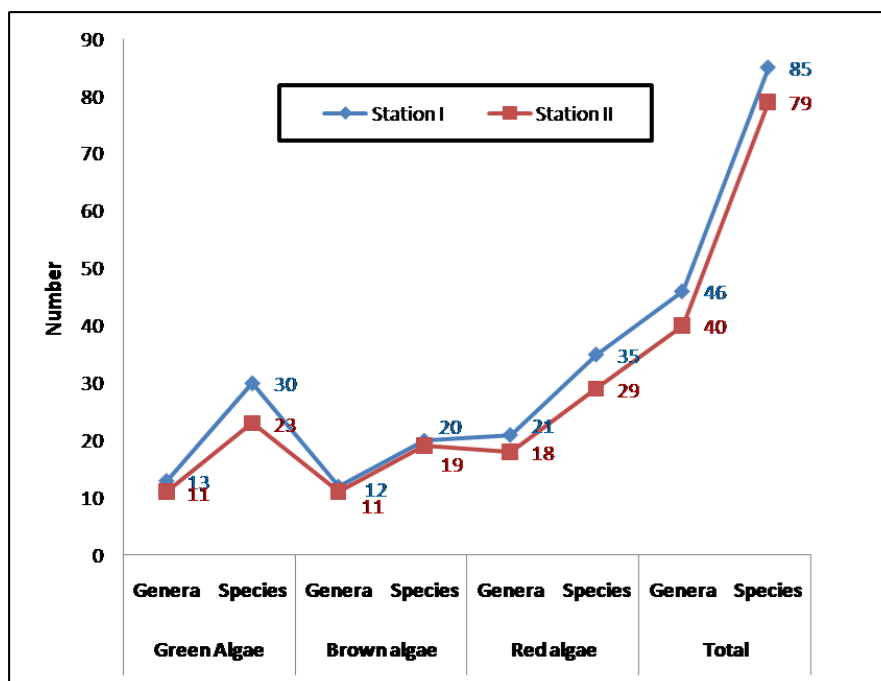
Totally 85 species were recorded including 46 genera in all groups of seaweeds which includes 13 genera, 30 species of green algae, 12 genera, 20 species of brown algae and 21 genera, 35 species of red algae (Table - 1). Maximum numbers of species were recorded in red algae compared to the other two groups of green and brown algae. Minimum numbers of species were recorded in brown algae. In station I, 85 species of drift seaweeds were recorded followed by 30 species (13 genera) of green algae, 20 species (12 genera) of brown algae and 35 species (21 genera) of red algae, while in station II, 71 species of drift seaweeds were recorded followed by 23 species (11 genera) of green algae, 19 species (11 genera) of brown algae and 29 species (18 genera) of red algae (Fig. 1).

**Table 1** Seaweeds species list

S. No	Species name	Distribution	
		Station I Tuticorin	Station II Tiruchendur
Chlorophyceae			
1	<i>Enteromorpha compressa</i>	✓	✓
2	<i>Enteromorpha intestinalis</i>	✓	✓
3	<i>Enteromorpha clathrata</i>	✓	×
4	<i>Ulva fasciata</i>	✓	✓
5	<i>Ulva lactuca</i>	✓	✓
6	<i>Ulva reticulata</i>	✓	✓
7	<i>Chaetomorpha antennina</i>	✓	✓
8	<i>Chaetomorpha linum</i>	✓	✓
9	<i>Chaetomorpha area</i>	✓	×
10	<i>Cladophora fascicularis</i>	✓	×
11	<i>Bryopsis hypnoides</i>	✓	✓
12	<i>Bryopsis plumose</i>	✓	✓
13	<i>Caulerpa peltata</i>	✓	✓
14	<i>Caulerpa racemosa</i>	✓	✓
15	<i>Caulerpa scalpelliformis</i>	✓	✓
16	<i>Caulerpa sertularioides</i>	✓	✓
17	<i>Caulerpa lentillifera</i>	✓	✓
18	<i>Caulerpa cupressoides</i>	✓	×
19	<i>Caulerpa taxifolia</i>	✓	×
20	<i>Codium adhaerens</i>	✓	✓

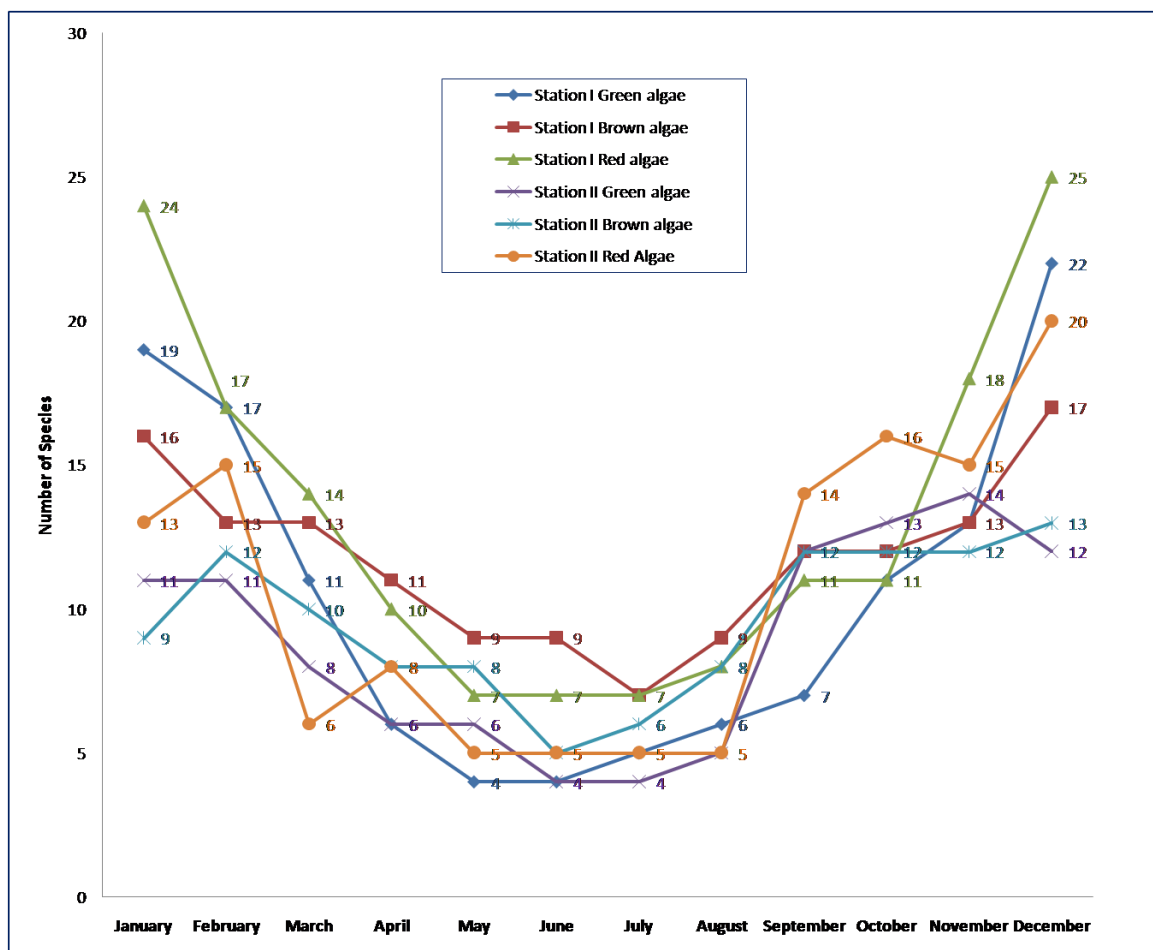
21	<i>Codium decorticatum</i>	✓	✓
22	<i>Codium tomentosum</i>	✓	✓
23	<i>Halimeda macroloba</i>	✓	✓
24	<i>Halimeda gracilis</i>	✓	✓
25	<i>Halimeda tuna</i>	✓	x
26	<i>Boodlea composita</i>	✓	✓
27	<i>Valoniopsis pachynema</i>	✓	✓
28	<i>Udotea indica</i>	✓	✓
29	<i>Valonia aegarophila</i>	✓	x
30	<i>Boergesenia forbesii</i>	✓	✓
<b>Phaeophyceae</b>			
31	<i>Dictyota bartayresiana</i>	✓	✓
32	<i>Dictyota dichotoma</i>	✓	✓
33	<i>Padina boergesenii</i>	✓	✓
34	<i>Padina tetrastromatica</i>	✓	✓
35	<i>Spatoglossum asperum</i>	✓	✓
36	<i>Stoechospermum marginatum</i>	✓	✓
37	<i>Colpomenia sinuosa</i>	✓	✓
38	<i>Hydroclathrus clathratus</i>	✓	✓
39	<i>Rosenvingeia intricata</i>	✓	✓
40	<i>Chnoospora minima</i>	✓	✓
41	<i>Hormophysa triquetra</i>	✓	✓
42	<i>Sargassum ilicifolium</i>	✓	✓
43	<i>Sargassum myriocystem</i>	✓	✓
44	<i>Sargassumswartzii</i>	✓	✓
45	<i>Sargassum tenerrimum</i>	✓	✓
46	<i>Sargassum wightii</i>	✓	✓
47	<i>Turbinaria conoides</i>	✓	✓
48	<i>Turbinaria ornate</i>	✓	✓
49	<i>Turbinaria decurrens</i>	✓	✓
50	<i>Lobophora sp.</i>	✓	x
<b>Rhodophyceae</b>			
51	<i>Gelidiella acerosa</i>	✓	✓
52	<i>Gelidumpusillum</i>	✓	✓
53	<i>Champia indica</i>	✓	✓
54	<i>Amphiroa anceps</i>	✓	✓
55	<i>Amphiroa fragilissima</i>	✓	x
56	<i>Grateloupia filicina</i>	✓	✓
57	<i>Grateloupia indica</i>	✓	x
58	<i>Grateloupia lithophila</i>	✓	✓
59	<i>Halymenia floresia</i>	✓	✓
60	<i>Halymenia venusta</i>	✓	✓
61	<i>Gelidiopsis variabilis</i>	✓	✓
62	<i>Gracilaria corticata</i>	✓	✓

63	<i>Gracilaria crassa</i>	✓	✓
64	<i>Gracilaria edulis</i>	✓	✓
65	<i>Gracilaria foliifera</i>	✓	✓
66	<i>Gracilaria textorii</i>	✓	✓
67	<i>Gracilaria verrucosa</i>	✓	×
68	<i>Jania rubens</i>	✓	✓
69	<i>Centroceras clavulatum</i>	✓	×
70	<i>Sarconema filiforme</i>	✓	✓
71	<i>Portieria hornemanii</i>	✓	✓
72	<i>Solieria robusta</i>	✓	✓
73	<i>Hypnea musciformis</i>	✓	✓
74	<i>Hypnea valentiae</i>	✓	✓
75	<i>Botryocladia leptopoda</i>	✓	✓
76	<i>Rhodomenia palmata</i>	✓	✓
77	<i>Rhodomenia dissecta</i>	✓	✓
78	<i>Spyridia filamentosa</i>	✓	✓
79	<i>Spyridia hypnoides</i>	✓	✓
80	<i>Porphyra chauhanii</i>	✓	✓
81	<i>Acanthophora spicifera</i>	✓	✓
82	<i>Griffithsia corallinoides</i>	✓	×
83	<i>Laurencia obtuse</i>	✓	✓
84	<i>Laurencia papillosa</i>	✓	✓
85	<i>Ceramium diaphanum</i>	✓	×



**Figure 1** Number of species in group wise

Maximum number of green algae were recorded in the months of December (22 species) at Station I, and minimum in month of June and July (4 species) at Station II (Fig. 2). The month of December has recorded in maximum number (17 species) of brown algae at Station I and minimum in June (5 species) at Station II. The Red algae were recorded highest level in month of December (25 Species) at Station I and low in months of May, June July and August (5 species) at station II.



**Figure 2** Number of Species in Month wise

Green algae, *Caulerpa scalpelliformis* was recorded in throughout the study period in both stations (Tables 2 & 5). *Ulva sp*, *Enteromorpha sp*, *Chaetomorpha sp*. and *Caulerpa sp*. were recorded in most of the months during survey period. *Bryopsis sp.*, *Codium sp.*, *Halimeda sp.*, *Boodlea composita*, *Udotea indica* and *Valonia aegarophila* were recorded in few months only at both the stations.

The brown algae, *Stoechospermum marginatum* and *Spatoglossum asperum* were recorded throughout the study period at both the stations (Tables 3 & 6). *Dictyota sp.*, *Padina sp.*, *Colpomenia sinuosa*, *Sargassum sp.* and *Turbinaria sp.* were recorded for about 8 to 10 months at both the stations. *Hydroclathrus clathratus*, *Rosenvingeia intricata*, *Chnoospora minima*, *Sargassum ilicifolium* and *Lobophora sp.* were recorded only at certain months in the collection period.

**Table 2** Fresh weight of green algae g/m<sup>2</sup> (Station I)

Species name	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
<i>Enteromorpha compressa</i>	136.67 ±9.51	42.14 ±2.54	90 ±5.7	0	0	0	0	0	254.12 ±11.24	0	0	10 ±0.7
<i>Enteromorpha intestinalis</i>	54.78 ±4.3	0	60 ±3.4	35.74 ±1.6	0	0	0	124.79 ±30.6	143.33 ±17.8	132.65 ±18.4	31.65 ±2.9	50 ±4.5
<i>Enteromorpha clathrata</i>	0	0	0	0	0	0	0	0	0	0	0	16.66 ±2.4
<i>Ulva fasciata</i>	374.15 ±42.5	190 ±20.8	0	0	0	0	0	0	0	0	310 ±18.1	312.85 ±25.7

<i>Ulva lactuca</i>	686.41 ±24.9	600 ±31.7	531.84 ±27.6	387.69 ±45.9	210 ±24.7	418.42 ±37.5	260.12 ±22.3	455.34 ±43.6	706.41 ±38.7	746.54 ±40.8	163.33 ±11.1	310.33 ±25.6
<i>Ulva reticulata</i>	36.47 ±2.4	61.34 ±3.7	0	0	0	0	0	0	0	0	14.66 ±0.8	34.57 ±1.5
<i>Chaetomorpha antennina</i>	0	0	62.46 ±3.5	0	0	0	0	0	0	0	13.37 ±2.1	17.45 ±1.8
<i>Chaetomorpha linum</i>	80.02 ±2.9	50.14 ±3.4	246.79 ±25.7	20.45 ±2.2	50.79 ±1.8	323.33 ±27.8	110 ±5.8	163.47 ±6.7	814.71 ±35.4	34.79 ±3.6	55.66 ±2.7	0
<i>Chaetomorpha area</i>	16.76 ±1.4	0	0	0	0	0	0	0	0	0	0	0
<i>Cladophora fascicularis</i>	0	13.33 ±1.5	0	0	0	0	0	0	0	0	0	0
<i>Bryopsis hypnoides</i>	22.94 ±1.6	0	0	0	0	0	0	0	0	80.24 ±11.7	0	56.55 ±6.4
<i>Bryopsis plumosa</i>	0	0	0	0	0	0	0	0	0	0	54.25 ±4.7	0
<i>Caulerpa peltata</i>	200.04 ±12.3	63.12 ±4.1	0	0	0	0	81.17 ±6.6	0	0	0	0	30.14 ±3.2
<i>Caulerpa racemosa</i>	490.33 ±24.5	106.66 ±7.5	135.47 ±6.4	84.27 ±7.5	0	0	0	180 ±21.4	323.33 ±24.7	274.36 ±29.6	113.41 ±14.6	40.05 ±4.9
<i>Caulerpa scalpelliformis</i>	2000.47 ±78.6	1153.33 ±47.8	866.42 ±33.5	1110.04 ±32.4	617.41 ±12.3	660.3 ±31.8	656.41 ±24.5	1100 ±23.7	1346.15 ±34.7	830.66 ±23.1	803.45 ±37.1	650.12 ±21.6
<i>Caulerpa sertularioides</i>	1233.45 ±31.5	336.42 ±21.8	364.15 ±14.7	0	0	0	0	0	0	306.45 ±27.4	0	243.12 ±25.7
<i>Caulerpa lentillifera</i>	380.45 ±23.5	406.66 ±25.7	0	0	0	0	0	0	0	0	0	280 ±26.1
<i>Caulerpa cupressoides</i>	0	0	163.33 ±14.7	0	0	0	0	0	0	0	0	0
<i>Caulerpa taxifolia</i>	623.21 ±24.7	310.47 ±29.8	0	0	0	413.33 ±14.3	0	0	626.74 ±22.3	0	0	73.58 ±7.4
<i>Codium adhaerens</i>	0	0	0	0	0	0	0	0	0	80.15 ±6.3	0	43.35 ±3.2
<i>Codium decorticatum</i>	0	33.41 ±2.1	0	0	0	0	122.62 ±8.6	254.65 ±9.4	0	0	0	40.15 ±3.1
<i>Codium tomentosum</i>	96.67 ±4.7	56.45 ±2.2	0	0	0	0	0	0	0	0	36.66 ±1.5	0
<i>Halimeda macroloba</i>	46.67 ±2.6	0	0	0	0	0	0	0	0	0	0	13.47 ±1.8
<i>Halimeda gracilis</i>	0	0	0	0	0	0	0	0	0	43.21 ±2.3	0	0
<i>Halimeda tuna</i>	0	0	0	0	0	0	0	0	0	0	31.34 ±3.4	23.33 ±2.8
<i>Boodlea composita</i>	0	0	0	0	0	0	0	0	0	0	0	10 ±1.6
<i>Valoniopsis pachynema</i>	750.15 ±41.2	436.66 ±31.4	360.15 ±22.1	330.45 ±20.5	163.33 ±14.6	0	0	0	0	213.37 ±19.8	133.47 ±14.7	126.41 ±11.4
<i>Udotea indica</i>	36.67 ±3.1	0	23.35 ±2.4	0	0	0	0	0	0	0	13.35 ±1.2	16.68 ±0.9
<i>Valonia aegrophila</i>	0	30.15 ±3.2	0	0	0	0	0	0	0	0	0	0
<i>Boergesenia forbesii</i>	13.33 ±1.1	13.24 ±1.1	0	0	0	0	0	0	0	20.45 ±3.2	0	16.66 ±2.2

Table 3 Fresh weight of brown algae g/m<sup>2</sup> (Station I)

Species name	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
<i>Dictyota bartayresiana</i>	0	165.23 ±12.5	276.66 ±21.8	116.41 ±13.7	163.35 ±9.8	0	245.78 ±25.7	0	633.31 ±29.4	110.05 ±7.5	83.31 ±3.5	53.44 ±2.7
<i>Dictyota dichotoma</i>	123.33 ±12.3	74.15 ±8.5	136.45 ±12.4	80.15 ±7.4	120.45 ±16.8	0	133.31 ±17.6	196.47 ±12.5	213.48 ±16.4	143.75 ±12.2	165.89 ±14.7	130.45 ±5.8
<i>Padina boergesenii</i>	223.15 ±31.5	56.45 ±4.7	116.75 ±5.8	0	80.15 ±7.5	113.74 ±11.5	0	126.45 ±9.8	80.15 ±7.6	40.45 ±5.6	133.45 ±14.8	63.33 ±4.8
<i>Padina tetrastrum</i>	140.05	180.45	100.5	136.66	0	320.45	126.65	0	343.33	176.48	80.15	123.33

	±15.8	±17.4	±10.7	±12.8		±28.7	±8.9		±28.7	±13.5	±7.6	±8.7
<i>Spatoglossum asperum</i>	1950.45 ±42.7	656.66 ±21.1	483.35 ±18.7	370.15 ±15.6	256.66 ±18.9	335.42 ±24.8	754.89 ±37.3	350.41 ±21.5	803.46 ±35.8	745.84 ±31.3	353.15 ±30.7	306.41 ±32.7
<i>Stoechospermum marginatum</i>	3250.15 ±150.45	2366.66 ±111.71	1080.12 ±94.61	2650.07 ±124.6	1316.41 ±85.4	736.41 ±51.2	1233.47 ±66.7	816.45 ±42.8	2100.46 ±148.2	1576.42 ±108.5	1206.23 ±75.4	845.61 ±32.7
<i>Colpomenia sinuosa</i>	46.65 ±5.7	50.15 ±6.1	0	36.66 ±3.2	0	0	0	0	60.05 ±5.3	80.45 ±7.1	33.33 ±2.8	35.45 ±3.4
<i>Hydroclathrus clathratus</i>	93.33 ±7.6	40.15 ±2.1	86.66 ±7.8	0	0	0	0	0	0	0	0	16.64 ±1.1
<i>Rosenvingeia intricata</i>	33.25 ±4.2	0	0	0	0	0	0	0	0	36.65 ±3.3	46.68 ±3.8	16.54 ±1.7
<i>Chnoospora minima</i>	316.66 ±28.6	0	0	0	0	0	0	0	0	0	0	233.56 ±22.4
<i>Hormophysa triquetra</i>	393.35 ±31.3	0	506.64 ±27.5	354.7 ±28.5	0	0	0	433.74 ±33.6	220.41 ±21.7	560.47 ±27.9	0	0
<i>Sargassum ilicifolium</i>	0	0	0	0	0	273.21 ±25.8	0	0	0	0	0	0
<i>Sargassum myriocystem</i>	1183.33 ±59.7	213.54 ±15.6	376.45 ±24.7	653.41 ±29.8	0	0	0	650.48 ±42.5	0	0	353.42 ±42.6	180.12 ±27.6
<i>Sargassumswartzii</i>	366.41 ±33.4	0	270.14 ±25.1	246.51 ±22.3	0	233.31 ±20.7	330.16 ±33.6	0	303.45 ±30.4	0	0	53.45 ±3.4
<i>Sargassum tenerrimum</i>	523.33 ±38.9	296.66 ±27.8	645.41 ±44.8	1603.48 ±68.7	1116.41 ±53.8	196.45 ±13.5	740.56 ±34.7	0	0	450.18 ±26.8	176.84 ±11.4	350.03 ±24.5
<i>Sargassum wightii</i>	630.45 ±35.7	0	0	840.15 ±41.7	576.84 ±32.2	463.55 ±32.4	0	393.41 ±	733.56 ±52.8	123.54 ±17.8	223.51 ±20.6	33.31 ±3.4
<i>Turbinaria conoides</i>	193.74 ±21.7	93.45 ±4.8	53.51 ±6.1	0	56.65 ±7.5	0	0	0	186.42 ±17.5	0	0	193.75 ±15.4
<i>Turbinaria ornata</i>	0	60.05 ±6.8	0	0	236.41 ±25.8	55.65 ±4.7	0	53.52 ±4.2	150.45 ±6.8	0	70.05 ±5.4	66.48 ±3.7
<i>Turbinaria decurrens</i>	213.47 ±28.6	33.33 ±3.5	0	73.45 ±2.4	0	0	0	163.33 ±15.7	0	0	236.45 ±25.7	140.25 ±14.6
<i>Lobophora sp.</i>	0	0	20.05 ±2.5	0	0	0	0	0	0	23.36 ±2.9	0	0

Table 4 Fresh weight of red algae g/m<sup>2</sup> (Station I)

Species name	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
<i>Gelidiella acerosa</i>	16.66 ±2.45	73.33 ±6.53	0	0	0	0	0	0	0	0	126.45 ±12.8	63.35 ±5.8
<i>Gelidumpusillum</i>	0	0	0	0	0	0	0	0	130.12 ±11.4	83.33 ±7.9	0	0
<i>Champia indica</i>	26.45 ±4.3	0	0	0	0	0	0	0	0	0	33.33 ±1.6	20.15 ±2.9
<i>Amphiroa anceps</i>	33.33 ±3.7	36.66 ±4.1	30.45 ±3.8	31.21 ±2.1	50.68 ±4.5	0	0	0	36.65 ±4.1	40.78 ±5.3	16.64 ±3.8	16.78 ±4.1
<i>Amphiroa fragilissima</i>	0	10.42 ±1.9	0	0	0	26.65 ±3.4	73.36 ±8.4	0	0	0	10.78 ±2.2	0
<i>Grateloupia filicina</i>	0	0	33.33 ±2.2	0	0	0	0	0	0	0	53.33 ±5.5	10.26 ±1.2
<i>Grateloupia indica</i>	90.68 ±3.4	110.84 ±21.8	0	0	0	0	0	0	0	0	0	0
<i>Grateloupia lithophila</i>	166.41 ±15.9	293.46 ±27.4	153.76 ±18.4	0	0	0	0	0	0	0	43.27 ±6.7	40.15 ±7.1
<i>Halymenia floresia</i>	0	133.33 ±12.5	0	0	0	0	0	0	0	0	0	156.74 ±19.6
<i>Halymenia venusta</i>	520.49 ±58.9	480.62 ±51.4	240.15 ±28.5	73.33 ±	0	0	0	0	143.33 ±17.2	166.75 ±11.3	310.46 ±34.8	53.37 ±4.7
<i>Gelidiopsis variabilis</i>	0	0	0	0	0	0	0	0	0	157.62 ±13.6	0	26.66 ±2.8
<i>Gracilaria corticata</i>	410.24 ±38.5	360.74 ±33.2	583.41 ±64.7	180.46 ±20.5	0	0	320.46 ±33.7	376.48 ±39.5	0	0	160.63 ±18.5	313.65 ±32.4



<i>Gracilaria crassa</i>	100.23 ±12.8	73.68 ±7.8	0	0	0	0	0	0	203.33 ±25.4	46.66 ±4.9	35.78 ±2.9	110.47 ±16.1
<i>Gracilaria edulis</i>	216.66 ±28.9	350.48 ±39.7	466.58 ±51.4	190.26 ±22.3	273.41 ±29.8	310.28 ±25.4	153.48 ±13.7	0	573.64 ±70.9	363.33 ±38.9	276.66 ±19.5	816.66 ±65.2
<i>Gracilaria foliifera</i>	96.66 ±10.8	230.15 ±18.9	203.64 ±31.4	0	113.37 ±18.5	0	86.46 ±8.5	0	340.18 ±38.4	233.78 ±31.8	70.86 ±10.5	183.64 ±21.4
<i>Gracilaria textorii</i>	70.15 ±5.4	0	0	0	0	0	0	0	0	0	16.66 ±1.8	36.48 ±2.6
<i>Gracilaria verrucosa</i>	123.33 ±10.5	0	0	0	0	0	0	0	806.67 ±91.8	0	0	86.95 ±10.5
<i>Jania rubens</i>	126.64 ±20.8	0	0	156.14 ±16.7	0	0	0	46.87 ±5.3	0	96.02 ±8.4	84.75 ±7.5	123.58 ±16.5
<i>Centroceras clavulatum</i>	0	0	0	0	0	0	0	0	0	0	0	10.48 ±1.6
<i>Sarconema filiiforme</i>	0	1250.14 ±110.8	910.75 ±104.9	576.66 ±61.7	856.47 ±86.4	706.41 ±74.6	696.66 ±70.6	356.13 ±41.8	1766.41 ±180.5	0	0	0
<i>Portieria hornemanii</i>	116.66 ±15.8	0	0	0	0	0	0	0	0	203.35 ±21.6	170.56 ±20.4	240.16 ±18.5
<i>Solieria robusta</i>	116.48 ±16.4	343.33 ±34.7	0	0	0	0	0	0	540.45 ±61.8	183.42 ±21.6	0	516.41 ±52.4
<i>Hypnea musciformis</i>	60.78 ±7.4	46.66 ±5.3	50.13 ±7.6	40.85 ±8.1	50.13 ±6.3	56.84 ±7.4	176.24 ±20.6	0	0	123.36 ±130.4	36.66 ±3.7	100.48 ±15.6
<i>Hypnea valentiae</i>	33.32 ±5.2	0	0	33.48 ±4.1	103.47 ±9.6	0	33.84 ±4.6	56.66 ±6.7	250.14 ±28.7	0	0	30.48 ±3.5
<i>Botryocladia leptopoda</i>	113.35 ±16.4	0	63.37 ±6.7	70.45 ±8.4	0	0	0	143.33 ±16.4	0	0	0	0
<i>Rhodymenia palmata</i>	136.47 ±19.8	0	46.62 ±5.8	0	0	33.35 ±3.6	0	0	0	0	0	26.54 ±4.1
<i>Rhodymenia dissecta</i>	63.33 ±7.4	76.48 ±9.5	0	0	0	0	0	0	0	0	0	0
<i>Spyridia filamentosa</i>	63.47 ±9.1	74.15 ±8.6	0	0	83.33 ±6.4	0	0	0	0	0	13.47 ±2.4	16.89 ±3.1
<i>Spyridia hypnoides</i>	0	0	26.66 ±3.5	0	0	56.74 ±8.4	0	116.66 ±13.8	0	0	0	0
<i>Porphyra chauhunii</i>	0	0	0	0	0	0	0	226.74 ±28.7	0	0	0	0
<i>Acanthophora spicifera</i>	216.66 ±20.5	360.51 ±39.7	333.47 ±33.6	0	0	406.74 ±44.7	0	486.65 ±49.8	743.33 ±81.4	0	616.74 ±58.9	516.78 ±61.8
<i>Griffithsia corallinoides</i>	13.47 ±2.8	0	0	0	0	0	0	0	0	0	0	0
<i>Laurencia obtusa</i>	33.33 ±4.1	0	0	16.66 ±2.5	0	0	0	0	0	0	36.66 ±4.7	18.79 ±4.2
<i>Laurencia papillosa</i>	0	0	0	0	0	0	0	0	0	0	0	13.34 ±2.4
<i>Ceramium diaphanum</i>	0	0	14.85 ±2.6	0	0	0	0	0	0	0	0	0

Table 5 Fresh weight of green algae g/m<sup>2</sup> (Station II)

Species name	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
<i>Enteromorpha compressa</i>	56.66 ±8.4	47.89 ±6.1	0	23.35 ±4.7	21.47 ±5.4	23.33 ±4.2	36.66 ±3.6	50.45 ±5.7	50.15 ±6.8	86.14 ±5.2	113.47 ±15.4	140.74 ±18.7
<i>Enteromorpha intestinalis</i>	0	33.37 ±4.1	36.41 ±5.1	0	0	0	0	0	0	160.17 ±18.4	133.45 ±18.7	116.42 ±18.5
<i>Ulva fasciata</i>	206.41 ±25.8	233.33 ±25.1	123.75 ±16.4	0	0	0	0	0	353.31 ±38.7	966.47 ±105.8	340.76 ±38.7	656.31 ±76.5
<i>Ulva lactuca</i>	306.66 ±36.4	0	26.66 ±4.8	264.74 ±31.8	140.21 ±18.5	0	0	100.48 ±16.7	166.74 ±19.7	323.33 ±36.5	440.79 ±52.3	936.47 ±102.7
<i>Ulva reticulata</i>	0	0	0	0	0	0	0	0	0	80.15 ±9.8	93.33 ±14.7	343.75 ±42.7
<i>Chaetomorpha linum</i>	0	0	0	0	0	213.41 ±25.7	110.06 ±15.4	0	0	0	0	0
<i>Chaetomorpha antennina</i>	20.15	26.67	20.45	36.64	33.35	0	0	23.33	70.48	0	0	0

	±3.5	±4.8	±3.5	±3.4	±2.8			±4.2	±6.4			
<i>Bryopsis hypnoides</i>	26.67 ±3.4	0	0	0	0	0	0	0	26.66 ±2.6	27.85 ±3.5	26.41 ±4.2	0
<i>Bryopsis plumosa</i>	0	0	0	0	23.41 ±3.6	0	0	0	0	0	26.58 ±4.2	0
<i>Caulerpa peltata</i>	0	180.46 ±21.7	0	0	0	0	0	0	423.35 ±52.3	463.15 ±50.7	0	283.74 ±33.4
<i>Caulerpa racemosa</i>	0	300.84 ±29.4	0	0	0	113.4 ±15.4	296.45 ±32.5	0	620.41 ±71.8	620.48 ±65.9	346.74 ±42.5	743.18 ±81.6
<i>Caulerpa scalpelliformis</i>	1966.6 ±204.6	1256.41 ±154.3	1385.47 ±142.6	1406.18 ±157.4	1106.81 ±126.3	0	1090.54 ±116.8	753.47 ±84.2	1830.45 ±192.7	1590.54 ±157.6	1446.15 ±149.7	1683.59 ±181.3
<i>Caulerpa sertularioides</i>	813.28 ±85.2	0	0	0	0	0	0	0	446.24 ±48.3	0	443.57 ±45.2	0
<i>Caulerpa lentillifera</i>	593.64 ±60.8	630.14 ±71.6	176.24 ±25.4	136.24 ±21.4	0	0	0	0	0	0	170.84 ±25.6	436.51 ±54.3
<i>Codium adhaerens</i>	0	0	0	0	0	0	0	0	90.47 ±12.7	36.41 ±6.5	0	0
<i>Codium decorticatum</i>	0	0	173.45 ±20.6	0	0	0	0	0	253.41 ±31.5	323.51 ±36.7	280.14 ±32.6	0
<i>Codium tomentosum</i>	0	0	0	0	0	0	0	0	0	156.47 ±20.4	0	633.48 ±70.5
<i>Halimeda macroloba</i>	176.45 ±23.6	86.51 ±10.5	0	0	0	0	0	0	26.67 ±5.2	0	0	0
<i>Halimeda gracilis</i>	0	46.68 ±6.3	0	0	0	0	0	0	0	43.33 ±5.7	0	200.17 ±26.7
<i>Boodlea composita</i>	0	0	16.66 ±3.6	0	0	0	0	0	0	0	18.79 ±2.7	0
<i>Valoniopsis pachynema</i>	0	665.42 ±72.5	0	0	0	0	0	623.47 ±71.4	0	0	646.12 ±64.8	890.28 ±104.8
<i>Boergesenia forbesii</i>	16.66 ±4.2	0	0	0	0	0	0	0	0	0	0	0
<i>Udotea indica</i>	13.333 ±1.5	0	0	12.47 ±2.5	11.67 ±1.2	13.52 ±3.4	0	0	0	0	0	0

**Table 6** Fresh weight of brown algae g/m<sup>2</sup> (Station II)

Species name	Jan	Feb	Mar	Aprl	May	June	July	Aug	Sep	Oct	Nov	Dec
<i>Dictyota bartayresiana</i>	0	0	780.47 ±84.6	0	0	0	0	0	0	0	0	163.47 ±16.4
<i>Dictyota dichotoma</i>	0	266.66 ±32.7	433.47 ±51.8	0	0	460.12 ±47.8	413.4 ±48.6	110.45 ±16.4	136.24 ±15.2	330.24 ±38.7	163.24 ±20.3	396.66 ±41.2
<i>Padina boergesenii</i>	56.06 ±7.5	163.42 ±17.2	203.34 ±26.8	0	296.54 ±33.4	0	0	33.37 ±4.1	166.48 ±18.6	426.82 ±50.9	446.26 ±52.3	303.38 ±37.4
<i>Padina tetrastromatica</i>		106.66 ±15.6	304.7 ±33.1	126.37 ±18.6	460.28 ±50.2	320.47 ±37.4	180.46 ±19.8	76.24 ±8.6	50.16 ±6.8	333.33 ±40.7	0	0
<i>Spatoglossum asperum</i>	0	0	0	0	0	0	0	0	310.47 ±37.1	200.16 ±26.3	0	0
<i>Stoechospermum marginatum</i>	1740.16 ±196.2	2540.84 ±194.6	2716.64 ±243.1	2196.85 ±307.5	1800.64 ±242.4	1146.25 ±187.4	893.64 ±95.8	653.33 ±76.3	2476.14 ±268.9	2710.48 ±329.4	2103.33 ±244.8	2436.85 ±285.2
<i>Colpomeniasinnosa</i>	100.47 ±17.8	146.25 ±16.5	0	53.37 ±6.8	56.64 ±7.4	130.47 ±19.5	60.47 ±7.8	96.64 ±12.4	63.38 ±7.5	0	183.49 ±20.6	266.78 ±30.7
<i>Hydroclathrus clathratus</i>	0	206.41 ±26.4	360.48 ±38.9	0	0	0	0	0	126.95 ±18.7	40.75 ±6.2	363.51 ±40.8	323.57 ±37.6
<i>Rosenvingeia intricata</i>	0	0	0	0	0	0	0	0	0	0	56.67 ±8.2	0
<i>Chnoospora minima</i>	0	0	0	0	0	0	393.37 ±47.3	586.41 ±64.2	0	0	0	0
<i>Hormophysa triquetra</i>	676.66 ±72.6	696.75 ±76.4	836.66 ±84.3	846.12 ±91.7	0	0	0	0	836.16 ±96.2	0	0	663.84 ±54.8
<i>Sargassum ilicifolium</i>	0	420.57 ±52.8	0	0	0	0	0	0	0	0	0	0

<i>Sargassum myriocystem</i>	580.29 ±66.6	0	0	0	316.48 ±41.4	0	0	0	0	636.67 ±47.9	453.85 ±58.7	296.47 ±36.5
<i>Sargassumswartzii</i>	253.37 ±31.24	0	410.75 ±51.7	406.28 ±48.5	0	0	0	0	0	423.75 ±47.1	0	0
<i>Sargassum tenerrimum</i>	766.65 ±84.3	2546.85 ±267.4	1400.19 ±219.7	333.48 ±27.6	856.47 ±142.8	996.38 ±74.3	440.49 ±35.7	356.78 ±	1453.95 ±198.6	330.33 ±49.7	1693.48 ±80.4	593.37 ±104.7
<i>Sargassum wightii</i>	1433.74 ±184.6	0	220.48 ±47.3	863.75 ±90.6	1140.08 ±209.4	0	0	346.66 ±35.7	440.12 ±50.2	863.95 ±143.7	840.16 ±127.5	940.18 ±184.6
<i>Turbinaria conoides</i>	1213.38 ±156.7	166.67 ±34.7	0	0	396.64 ±36.2	0	0	0	80.16 ±12.4	336.66 ±46.8	330.45 ±37.5	106.68 ±14.7
<i>Turbinaria ornata</i>	0	120.48 ±24.7	0	0	0	0	0	0	0	73.34 ±8.6	63.65 ±9.4	53.12 ±7.2
<i>Turbinaria decurrens</i>	0	693.54 ±124.8	0	60.45 ±18.7	0	0	0	0	313.47 ±24.2	0	123.48 ±16.5	50.47 ±8.9

Red algae, *Gracilaria sp.*, *Amphiroa anceps*, *Sarconema filiforme*, *Halymenia venusta*, *Hypnea sp.*, *Grateloupia lithophila* and *Acanthophora spicifera* were recorded in 8 to 11 months of study period at both the stations (Tables 4 & 7). *Gelidium pusillum*, *Champia indica*, *Spyridia sp.*, *Laurencia sp.*, *Solieria robusta*, *Rhodymenia sp.* and *Jania rubens* were recorded at around 5 to 7 months at both the stations. *Gelidiella acerosa*, *Halymenia floresia*, *Centroceras clavulatum*, *Porphyra chauhanii* and *Ceramium diaphanum* were recorded in few months only.

The most abundant green algae were *Caulerpa scalpelliformis* and *Ulva lactuca* showing the highest biomass throughout the collection with maximum values of  $2000.47 \pm 78.6$  g fr. wt.  $m^2$  (Station I),  $936.47 \pm 102.7$  g fr. wt.  $m^2$  (Station II) and minimum values of  $617.41 \pm 12.3$  g fr. wt.  $m^2$  (Station I),  $26.66 \pm 4.8$  g fr. wt.  $m^2$  (Station II) (Tables 2&5). The dominant biomass of brown algae was *Stoechospermum marginatum* with maximum biomass of  $3250.15 \pm 150.45$  g fr. wt.  $m^2$  (Station I–Jan.) and  $2716.64 \pm 243.1$  g fr. wt.  $m^2$  (Station II–March) and minimum of  $736.41 \pm 51.2$  g fr. wt.  $m^2$  (Station I–June) and  $653.33 \pm 76.3$  g fr. wt.  $m^2$  (Station II–Aug) which was shown in Tables 3&6. *Spatoglossum asperum* was also recorded throughout the study period with maximum value of  $1950.45 \pm 42.7$  g fr. wt.  $m^2$  (Station I–Jan), and minimum value of  $200.16 \pm 26.3$  g fr. wt.  $m^2$  (Station II–Oct). The highest biomass value of red algae was observed in *Sarconema filiforme* of  $1766.41 \pm 180.5$  g fr. wt.  $m^2$  (Station I–Sep) and  $1523.34 \pm 180.4$  g fr. wt.  $m^2$  (Station II–Sep) (Tables 4 & 7).

**Table 7** Fresh weight of red algae g/ $m^2$  (Station II)

Species name	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
<i>Gelidiella acerosa</i>	106.23 ±17.8	73.35 ±11.4	0	0	0	0	0	0	0	80.12 ±10.3	0	206.75 ±23.4
<i>Gelidumpusillum</i>	46.66 ±6.8	33.33 ±4.2	0	0	0	0	0	0	36.41 ±3.8	80.15 ±10.2	60.05 ±8.1	100.45 ±14.6
<i>Champia indica</i>	33.33 ±6.2	26.66 ±3.5	0	16.47 ±2.5	0	0	0	0	0	26.78 ±3.4	24.85 ±3.5	46.75 ±7.8
<i>Amphiroa anceps</i>	120.45 ±15.4	116.66 ±13.7	0	0	0	0	168.74 ±21.5	126.41 ±15.4	110.78 ±16.3	180.25 ±20.6	143.33 ±17.4	166.13 ±20.3
<i>Grateloupia filicina</i>	63.33 ±7.5	0	0	0	0	0	0	0	35.42 ±6.2	0	0	0
<i>Grateloupia lithophila</i>	250.15 ±28.4	336.66 ±37.3	120.74 ±15.6	86.66 ±10.4	46.66 ±6.7	160.18 ±20.3	143.65 ±18.5	240.75 ±30.4	0	133.74 ±19.5	326.31 ±40.2	290.56 ±36.4
<i>Halymenia floresia</i>	0	0	0	0	0	0	0	0	0	0	16.66 ±5.6	23.33 ±4.7
<i>Halymenia venusta</i>	0	0	0	0	0	0	0	0	26.66 ±4.4	30.04 ±5.1	86.64 ±10.4	70.85 ±8.5
<i>Gelidiopsis variabilis</i>	0	56.66 ±4.7	0	0	0	0	0	0	0	0	53.33 ±7.1	50.65 ±8.6
<i>Gracilaria corticata</i>	0	1326.54 ±170.5	0	353.31 ±41.2	423.54 ±35.8	443.54 ±44.2	373.58 ±40.3	393.65 ±36.8	950.15 ±107.5	940.08 ±103.5	363.33 ±37.8	636.47 ±72.3
<i>Gracilaria crassa</i>	0	383.45 ±43.5	103.41 ±16.7	0	0	90.07 ±10.7	0	0	336.66 ±39.8	0	166.65 ±20.7	406.75 ±55.2
<i>Gracilaria edulis</i>	0	1106.66 ±147.3	736.66 ±83.5	0	150.12 ±20.7	0	0	173.33 ±21.6	326.65 ±40.5	1250.41 ±106.4	363.78 ±40.7	900.15 ±102.7
<i>Gracilaria foliifera</i>	0	0	0	0	0	0	0	0	0	536.66 ±60.8	0	0
<i>Gracilaria textorii</i>	0	0	0	160.47	0	0	0	0	0	0	0	0

				±21.6								
<i>Jania rubens</i>	213.45 ±26.5	126.57 ±18.5	0	0	0	0	0	0	163.25 ±21.6	240.18 ±28.4	0	0
<i>Sarconema filiforme</i>	1230.05 ±114.3	0	0	0	0	0	0	0	1523.34 ±180.4	656.68 ±	0	0
<i>Portieria hornemanii</i>	0	0	0	0	0	0	0	0	0	323.48 ±38.7		1146.68 ±125.4
<i>Solieria robusta</i>	556.58 ±60.3	0	0	0	0	0	0	0	0	0	0	0
<i>Hypnea musciformis</i>	126.65 ±18.7	106.74 ±16.4	0	33.35 ±4.5	50.12 ±6.2	63.33 ±7.3	110.08 ±14.6	0	80.45 ±9.6		126.66 ±18.4	186.78 ±21.8
<i>Hypnea valentiae</i>	0	0	0	0	0	0	0	36.66 ±4.8	0	106.66 ±8.5	0	54.52 ±6.3
<i>Botryocladia leptopoda</i>	63.35 ±8.6	0	0	0	0	0	0	0	126.45 ±17.3	0	0	36.47 ±6.4
<i>Rhodymenia palmata</i>	0	0	33.33 ±4.7	34.52 ±3.5	0	0	0	0	0	70.54 ±6.2	0	33.65 ±4.5
<i>Rhodymenia dissecta</i>	0	0	0	0	0	0	0	0	33.33 ±4.3	0	0	0
<i>Spyridia filamentosa</i>	103.35 ±21.7	80.45 ±12.5	0	0	0	0	0	0	0	183.65 ±22.5	116.74 ±16.8	303.33 ±25.7
<i>Spyridia hypnoides</i>	0	0	0	0	0	0	0	0	0	0	180.24 ±20.4	250.45 ±26.7
<i>Porphyra chauhanii</i>	0	280.15 ±30.6	0	173.64 ±20.7	0	0	0	0	1230.75 ±146.3	356.47 ±43.7	0	0
<i>Acanthophora spicifera</i>	556.66 ±60.4	0	353.42 ±41.8	316.41 ±38.7	366.64 ±40.8	353.25 ±42.7	0	0	0	0	726.54 ±86.4	1106.41 ±118.2
<i>Laurencia obtusa</i>	0	43.33 ±8.4	0	0	0	0	0	0	0	0	0	0
<i>Laurencia papillosa</i>	0	67.33 ±9.7	26.66 ±4.5	0	0	0	56.66 ±8.6	0	326.14 ±42.5	0	140.74 ±19.4	113.65 ±17.4

The maximum biomass of green algae was recorded in the month January (7.279 Kg. fr. wt. m<sup>2</sup>) at station I and minimum in month of June (0.363 Kg. fr. wt. m<sup>2</sup>) at Station II (Figure 3). Biomass of brown algae were ranged from 9.681 Kg. fr. wt. m<sup>2</sup> (January – Station I) to 1.787 Kg. fr. wt. m<sup>2</sup> (July – Station II). and red algae 6.13 Kg. fr. wt. m<sup>2</sup> (December – Station II) to 0.97 Kg. fr. wt. m<sup>2</sup> (August – Station II).

A totally 70.733 kg fr. wt m<sup>2</sup> of green algae were collected in throughout the year including station I (33.582 kg fr. wt m<sup>2</sup>) and station II (37.151 kg fr. wt m<sup>2</sup>). Total biomass of brown algae was recorded as 113.909 kg fr. wt m<sup>2</sup> including station I (54.578 kg fr. wt m<sup>2</sup>) and station II (59.331 kg fr. wt m<sup>2</sup>) respectively. Total biomass of red algae was recorded as 64.842 kg fr. wt m<sup>2</sup> (Table 8).

**Table 8** Total biomass of seaweeds in station wise and group wise

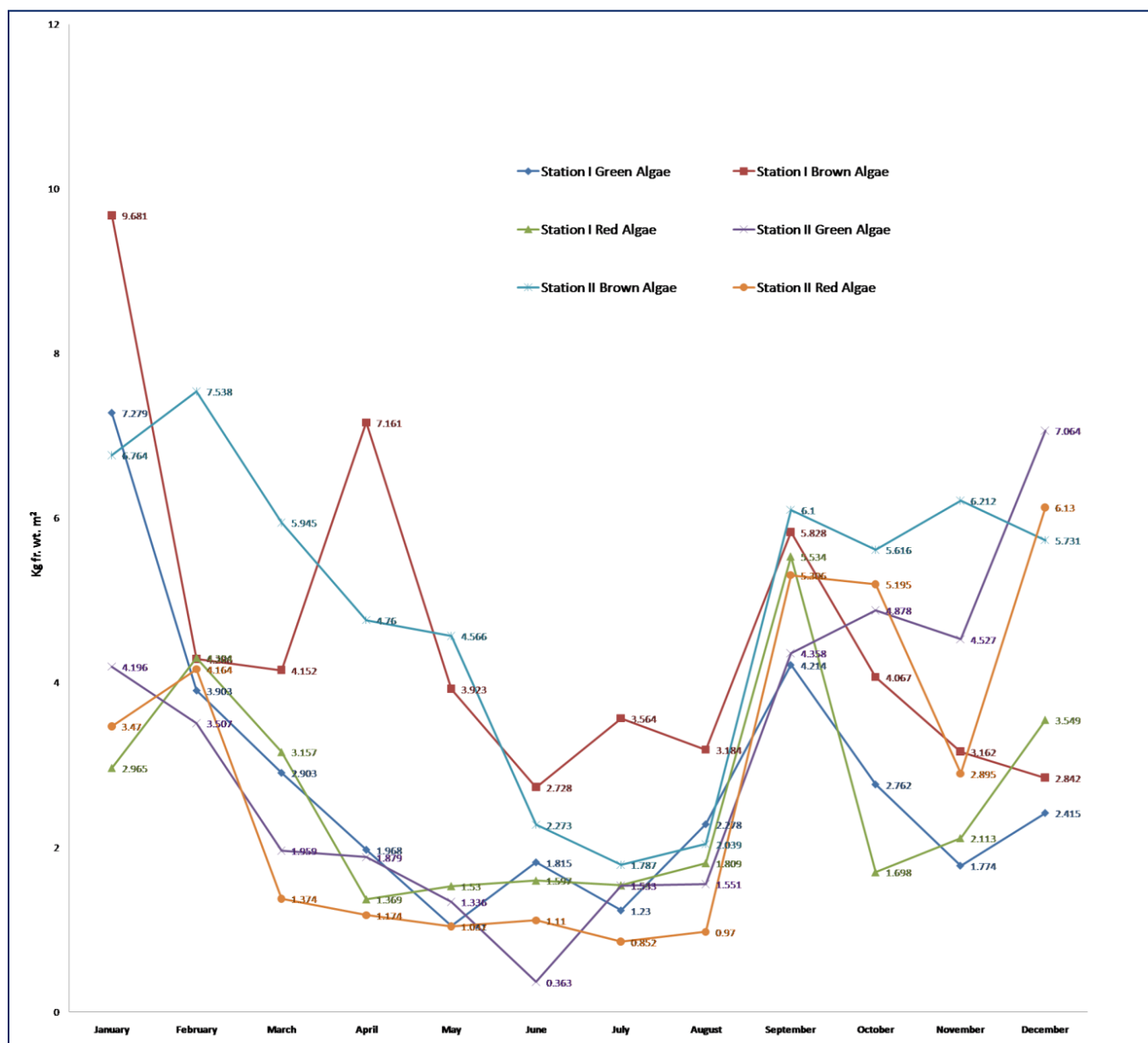
Groups of Algae	Station I	Station II	Total
<b>Green Algae</b>	33.589	37.156	<b>70.745</b>
<b>Brown Algae</b>	54.583	59.336	<b>113.919</b>
<b>Red Algae</b>	31.170	33.683	<b>64.854</b>
<b>Total</b>	<b>119.343</b>	<b>137.885</b>	

All values are measuring in Kg fr. wt. m<sup>2</sup>

#### 4. DISCUSSION

Seaweeds are important marine and estuarine plants distributed throughout the world. The biomass as well as species composition of seaweeds largely depend on season, population structure and several other ecological factors (Thakur et al. 2008). Drifting seaweeds plays a major role in areas where they are present. They act as nursery for a vast amount of species, but also are a good bio-indicator of water quality. Such algae hosts moving ecosystems, and identifying the drift path is necessary in order to clarify their roles. Particle tracking techniques have proven to be the most robust and common approach to identify drifting paths (Reynolds, 2003). Studies on the diversity and distribution of seaweeds in Indian waters were carried out by several authors

(Untawale et al. 1989; Kalimuthu et al. 1995; Jayachandran and Ramaswamy, 1997; Kaliaperumal and Kalimuthu, 1997; Stella Roslin et al. 1997; Selvaraj and Selvaraj, 1997; Mohammed et al. 1999; James et al., 2004; Kerkar, 2004; Rath and Adhikary, 2006; Satheesh and Wesley, 2012). Southeast coast of India is a unique marine habitat characterized by high biodiversity. Results of the present study indicate the occurrence of 85 species total which were recorded under 46 genera in all groups of seaweeds as follows 13 genera, 30 species of green algae, 12 genera, 20 species of brown algae and 21 genera, 35 species of red algae at station I and station II. The richness of seaweed resources is due to the coral reef and intertidal rocky reefs available in the Tuticorin and Tiruchendur coast. Similarly Janet Rani et al. (2013) were examined in five stations viz., Arockiapuram, Kootapuli, Uvari, Manapad, Punnakayal in the Southeast coast of Tamil Nadu. A total of 53 taxa were recorded in the five different stations in which 21 taxa belonging to Chlorophyta, 15 taxa to Phaeophyta and 17 taxa to Rhodophyta. The present study was recorded as rich diversity in Tuticorin coast compare to Janet Rani et al. (2013).



**Figure 3 Biomass of seaweeds in Month wise**

It is probable that some of the species might have been lost due to changes in the environmental conditions over a long period of time. Same number of (55 species) algal species was recorded in the survey of the intertidal and shallow water area (upto 4 m depth) from Kattapadu to Tiruchendur (Anon, 1978). It is also evident that 20 algae recorded in the (Kaliaperumal et al. 1995) surveys were found in the intertidal and shallow water region from Kattapadu to Tiruchendur.

Satheesh and Wesley (2012) recorded that in the total of 32 taxa in the Kudankulam region, 15 belongs to green, 8 to brown and 9 to red. Cosman et al. (2013) recorded that taxonomically, a total of 38 taxa belonging to 3 phyla (Chlorophyta, Ochrophyta and Rhodophyta), 4 classes (Bryopsidaceae, Florideophyceae, Phaeophyceae and Ulvophyceae), 18 families and 23 genera were inventoried in the Muttom coastal waters. Among the 18 families, Dictyotaceae, Rhodomelaceae and Sargassaceae were the richest ones (5 species each), followed by Gracilariaceae (4 species), Caulerpaceae and Ulvaceae (3 species each) and Cystocloniaceae (2 species), whereas the remaining families (Bonnemaisoniaceae, Bryopsidaceae, Ceramiaceae, Cladophoraceae, Corallinaceae, Gelidiaceae, Gelidiellaceae, Halymeniaceae, Lomentariaceae, Rhizophyllidaceae and Scytosiphonaceae) were monospecific. These studies recorded low biomass distribution when compared to the present study.

The seaweed distribution observed in the present study was similar to the reports on Southeast coast of Tamil Nadu (Edwin et al. 2004; Janet Rani et al. 2013), Goa (Kerkar, 2004), Orissa (Rath and Adhichary, 2006), and nearby Tiruchendur coast (Chennubhotla et al. 1991). During the present study, *Enteromorpha* sp., *Ulva* sp., *Caulerpa* sp., *Stoechospermum marginatum*, *Spatoglossum asperum*, *Sargassum* sp., *Gracilaria* sp., *Sarconema* sp. were observed in maximum biomass throughout the study period. Earlier study (Satheesh and Wesley, 2007) also have reported that *Gracilaria* sp., *Enteromorpha* sp., and *Ulva* sp. showed dense settlement during pre-monsoon and post monsoon months on test panels.

In this present study, maximum biomass was recorded in the month of January (9.681 kg fr. wt m<sup>2</sup>) at station I, and minimum biomass was recorded in June (0.363 kg fr. wt m<sup>2</sup>) at station II. Mukund et al., (2008) reported that the maximum biomass of seaweeds was recorded in the month of February (6.6 kg fr. wt m<sup>2</sup>), and minimum was recorded in May (0.55 kg fr. wt m<sup>2</sup>). This result was similarly correlated to the present study reports, because both the studies show that maximum biomass was recorded in post monsoon season and minimum in summer season.

## 5. CONCLUSION

The present study could be useful as new baseline record for future biomonitoring studies in Tuticorin and Tiruchendur coast. The seaweed resources may provide useful data for the conservation and commercial use of marine algal resources in this region.

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